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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,887	12/30/2004	Yuichi Tokita	S1459.70056US00	2734
23628 7590 09/04/2007 WOLF GREENFIELD & SACKS, P.C. 600 ATLANTIC AVENUE BOSTON, MA 02210-2206			EXAMINER TRINH, THANH TRUC	
			ART UNIT 1753	PAPER NUMBER
			MAIL DATE 09/04/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/519,887	<b>Applicant(s)</b> TOKITA ET AL.	
	<b>Examiner</b> Thanh-Truc Trinh	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 August 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wariishi et al. (US Patent 6376765) in view of Osuka (WO 02/14322). Since the publication of Osuka is in Japanese, citations below are given to the U.S. Patent 6812343 that issued from US National Stage entry of this international application, which is an accurate translation. Also, a machine translation of this publication is attached to support the citation of the Examiner.

Regarding claims 1-7, 9-10, as seen in Figure 1, Wariishi et al. disclose a dye-sensitized solar cell comprising a semiconductor layer 20, on which a sensitizing dye having an acidic group-containing porphyrin disposed; an electrolyte layer (or charge

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transport layer 30) between counter electrodes 10 and 40. The porphyrin structure has acidic substituents. (See Figure 1, col. 29 formulas R-15 and R-16).

Regarding claim 8, Wariishi et al. describe the semiconductor comprising an oxide semiconductor. (See col. 24 lines 19-26).

Regarding claim 11, Wariishi et al. describe the semiconductor layer and the electrolyte layer are provided between a transparent base having a transparent conductive film and a conductive base serving as a counter electrode of the transparent base, and electric energy is generated between the transparent conductive film and the conductive base by a photoelectric conversion. (See Figure 1 and col. 22 lines 13-68 and col. 23 lines 1-56).

Wariishi et al. do not teach using a sensitizing dye having an acidic group containing porphyrin polymer with formulas as shown by the Applicant.

Osuka teaches using porphyrin polymer having an acidic group-containing porphyrin polymer, (See general formula 1 and col. 3 lines 64-68 and col. 4 lines 1-64). As M is 2H (See col. 3 line 30), the general formula 1 of the reference is equivalent to the general formulas in the instant claims 1 and 3. As M is a complex with metal group A (See col. 3 lines 30-36), the general formula 1 of the reference is equivalent to the general formulas in instant claims 2 and 4. Osuka also teaches n is an integer bigger than 2. (See col. 3 line 12), R1-R24 are respectively selected independently from the group consisting of hydrogen, carboxyl group, sulfonic acid (See col. 2 lines 64-68), carboxylic acid ... (See col. 3 lines 1-11), M is the metal complex comprising Zn, Mg, Ca ... (See col. 3 lines 42-36).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Wariishi et al. by using porphyrin polymer as taught by Osuka, because it would provide rapid non-coherent excitation energy transfer hopping and lack of an energy sink that blocks the energy transfer. (See col. 1 lines 61-68)

### ***Response to Arguments***

Applicant's arguments filed 8/10/2007 have been fully considered but they are not persuasive.

Applicant argues that the combination of Wariishi and Osuka is improper, because Osuka describes the properties of linked porphyrin arrays for use as conductive molecules or wires. Applicant further argues that Osuka does not suggest that linked porphyrin arrays would have been capable of performing photoelectric conversion. The Examiner replies that Wariishi et al. teach that the dye absorbs light to generate electrons then conducts the electrons to the semiconductor fine particles. (See '765 col. 25 lines 58-67). It is true that Osuka teaches using linked porphyrin arrays for conductive molecules, or molecular wire in a realistic molecular scale (See col. 1 lines 61-67 bridging col. 2 lines 1-10) because, as the dye absorbs light to generate electrons, it has to transfer or conduct the electrons to the semiconductor particles as taught by Wariishi et al.. Osuka also teaches that the porphyrin polymers, or linked porphyrin arrays, can be explored based on a strong absorbance in the visible region. (See col. 1 lines 46-52). Therefore, Osuka teaches linked porphyrin arrays, or porphyrin

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polymers, that are capable of performing photoelectrical conversion such as absorbing light and conducting electrons like a dye. The Examiner maintains that use of porphyrin polymers taught by Osuka in the dye-sensitized solar cell of Wariishi et al. would clearly have been obvious to a skilled artisan.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh-Truc Trinh whose telephone number is 571-272-6594. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

TT  
08/28/2007

  
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